

XXIX.—*The Birds of Calcutta, collected and described by*
CARL J. SUNDEVALL*.

[Concluded from p. 173.]

100. *Podiceps philippensis*, Temm. Man. ii. p. 129; et ibid. Analyse, p. cvii; Buff. Pl. Enl. 945.—*P. minor*, var. β , Lath. Fuscens remigibus cubiti albis; tarso postice duplici serie irregulariter serrato: interne 8—9-dentato; digitis margine undique integerrimo†.

♂ (d. 22 Martii). Iris flava. Corpus dilutius quam *P. minor*; superne cum alis et capillitio rufescenti-fuscum, nucha pallidiore; subtus albidum, collo pallide cinerascens. Remiges primariæ undecim: 2^{da} reliquis longior; omnes fuscae basi et intus late albæ. Remiges cubiti albæ: mediæ immaculatæ; anticæ et posticæ macula fusca extus, prope apicem, in posticis majore. Tectrices fuscae. Rostrum majus, sutura recta; forma ut *P. cornuti*. Caput absque crista vel barba. In tarsi margine postico squamulæ seriei exterioris circa 23, quarum 17 (sc. 3 et sequ.) serratæ; interioris 18, quarum 9 (sc. 7^a—15^a) serratæ; mediæ utriusque seriei majores, obtusi.—Paullo major quam *P. minor*. Long. $8\frac{3}{4}$ poll. Rostrum e fronte 23 millim., ad fauces 29, altit. $8\frac{1}{2}$, cum cranio 52; ala 97 millim., tarsus 37, dig. med. 40, cum ungue 46.

Alia individua (eodem die; veris. seniores), collo dilute rufo.

Indiv. e Java (coll. Gyllenkr.) obscurius, capite supra et tota nucha nigro-fusca. Occipitis et colli superioris latera castanea. Ala 112 millim., digitus medius 44, cum ungue 50. Cetera ut descr. superior.

The species of the genus *Podiceps* are among the more difficult to define by general characters, as may be seen in the two largest, viz. our *P. cristatus* and *rubricollis*. In the winter dress these can hardly be distinguished but by size, and in fact specimens of the smaller species (*P. rubricollis*) are often met with which are decidedly larger than many of *P. cristatus*. Like water-birds in general, they vary more than land-birds in size and colour. The Indian species just described is very like our *P. minor*, so that they may easily be confounded, even in the summer dress. It occurs not rarely about Calcutta, and was very common at the end of March in the small lakes near Sucsagor. Five or six commonly kept together. They dived with remarkable activity, and when alarmed flew only a short way close over the water, on the surface of which they were often seen to run.

In addition to these birds, which with two exceptions were

* Translated from the 'Physiographiska Sällskapets Tidskrift' by H. E. Strickland, M.A.

† *Pod. minor* remigibus cubiti albis, omnibus extus plaga fusca, posticis fere totis fuscis; tarso postice duplici serie regulariter serrato denticulis æqualibus, interne sub-12. Digitorum membrana serrulata. Rostrum minus.

found within the boundaries of Bengal, I may reasonably enumerate the water-birds which I saw in the Bay of Bengal, and which certainly often come ashore in that country.

101. *Tachypetes aquilus*, Vieill., *Pelecanus*, Linn. Frigate-birds were seen several times in December in the Indian Ocean, between 10° N. and 10° S., but not beyond these limits. There were commonly two or three not far from each other, and in places where flocks of other sea-birds were assembled, but the frigate-birds soared high over these in large circles like the kite, with which it has so much resemblance in the form of tail, size, and mode of flight, that one might easily mistake them. Occasionally the colour of one species (*T. minor*) resembles that of the kite. The wings however are more angular, and the long beak is distinctly visible. The feet are more like those of *rapacious* than of *natatorial* birds, and the membrane is scarcely larger than that found at the base of the toes in most birds of prey. The plumage also has a rather anomalous appearance for a water-bird, especially in the feathered tibia. It constitutes a truly transitional form between the rapacious and natatorial birds. It is often seen to plunge into the water from a great height after the flying-fish, which seem to form its principal food. All the specimens I saw were white below, and seemed to be blackish above. I saw no frigate-birds in the Atlantic Ocean, though they are found there also, and breed abundantly on Ascension Island (see Burton in Linn. Trans. vol. xiii. p. 1). They are stated to lay only a single egg, upon the ground, in September, which is sat upon by the male, who is wholly black; the female, who is white below, procures food. They cannot walk on the ground. (Burton, *l. c.*)

102. *Phaëton melanorhynchus*? Gm., Lath. Small Tropic-birds occur commonly in the Indian Sea, within the torrid zone; but though I certainly saw hundreds, and many of them only twenty or thirty ells distant, I did not succeed in getting any; for if one were to shoot a bird in the open sea, it is commonly impossible to procure it. This species is hardly as big as a pigeon; it seems but little larger than *Sterna hirundo*, and is all white except a black band near the eye and one upon the wing. The tail is rounded, rather shorter than that of a pigeon, with two long white medial feathers, which measured from the root are as long as the rest of the body including the beak. Among the many which I could distinctly observe, not one occurred which had these feathers red, or as long as they are commonly figured and described in Tropic-birds. The beak appeared red and the feet black. The young ones are waved with black or gray on the upper part. In outward appearance and mode of flight it resembles a

tern, but the neck is more extended, and the wings are moved incessantly. It flies constantly, not remarkably quick and somewhat unsteadily, generally at the height of twenty or thirty ells; I never saw any of them repose upon the water. Two or three are often seen together, when they appear to chase one another, and utter a shrill cry like *tjeck, tjeck*. During flight they are wont frequently to turn the head and look behind them, which action is especially characteristic, as one seldom sees it in other birds. They seem to be very inquisitive, and often come near to examine the pennant of the ship. They would fly round it for half an hour, and look at it from every side as though they would bite at it, fly away and return several times, till at last they seemed weary and took themselves off. Occasionally they plunged straight down into the water to catch flying-fish, and on two occasions I distinctly saw them come up again with one in their beak. It occurred to me that Tropic-birds may migrate with the sun, for in my outward voyage across the Indian Ocean from November to January, they were seen as far as 26° S. (on Nov. 7), but on my homeward voyage from May to July they were not seen further south than 7° (July 7). Far up in the Bay of Bengal, till within ten or twelve [Swedish] miles from the land, they were seen at both seasons, though they were rare in January and very abundant in May.

In the Atlantic Ocean I did not see more than two Tropic-birds, and both times at a distance, so that I am not sure what species it was. Several of the crew who had been in Brazil said that they had but seldom seen these birds, and that they are there much larger than those we saw in the Indian Sea. It seems to me highly probable that the small Tropic-bird never occurs in the Atlantic, and the large one but rarely.

103. *Phaëton æthereus*, L. The great Tropic-bird in colour resembles the last, but is twice the size, nearly as large as a tame duck, with a rather longer and thicker neck, and the two feathers in the tail only twice as long as the other rectrices (the part which extends beyond the tail seemed about one quarter the length of the bird). In flight and mode of life it resembled the foregoing species, but was more slow in its motions. I saw it only a few times in the northern part of the Indian Ocean. One was seen in December which wanted the two long tail-feathers.

In the same region, namely in the southern part of the Bay of Bengal, there was seen occasionally in December a bird which I believe was the young *P. æthereus*. It resembled it in size, form, flight and voice, but seemed altogether ash-gray, and wanted the two long tail-feathers*.

* The species here termed *æthereus* appears to be the *P. phœnicurus*.—H. E. S.

104. *Dysporus piscator*, Ill.—*Pelec. piscator*, L., Lath. *Sula candida*, Briss. (adulta). *P. sula*, L. et Auct. (diagnosis e juniori hujus sp., sed synonymia et descriptio sunt alius speciei).

Gula nuda; rostro tenuiore, apice curvato, facie pedibusque rubris; cauda acuta.

Vetus fere totus albus, dorso pure colorato. Remiges et rectrices nigro-fuscae. Facies, rostrum et pedes corallino-rubra. Ala 360 millim., cubitus 200, cauda 200, cetera ut sequ. *Mediæ atatis*? albus, dorso toto, alis caudaque fusco-cinereis, plumis sparsis albidis sordidisve. Alarum tectrices præsertim albo-variæ. Pectus ad latera pallide fuscum. Remiges et rectrices obscure fuscæ. Rostrum apice fuscum. Ala 320 millim., cubitus fere 200, cauda 190, tarsus 30, digitus medius cum ungue 66, rostrum e plica frontis 80, e fauce 110, altit. baseos 27.

Junior pallide fusco-cinereus, jugulo pectoreque dilutioribus, ventre albido. Corpus superne, præsertim in alis, plumis albidis et obscuris maculatum. Facies et pedes sordide rubicundi.

Vix duo colore perfecte similes invenies. Etiam dimensiones paullo variabiles. Rostrum e basi sensim angustatum, apice sutura sat curvata. Facies late nuda, limite plumata non ad fauces angulata, sed gulam nudam circulariter ambiente. Rectrices $2\frac{1}{2}$ poll. excedunt alas; minus rigidæ, mediæ apice acutæ.

The species of *Dysporus* are much like each other, and remarkably distinguished from other allied forms. The genus *Phaëton* approaches them the nearest. They are sea-birds which only approach cliffy sterile shores to breed, but which are otherwise chiefly seen far from the land, often in the midst of the ocean, in regions where the water is not very deep, as on banks of 20 to 100 fathoms, where they have access to fish and crustacea. They fly almost incessantly, but heavily, with their somewhat long neck stretched out, in a straight line but not rapidly, and flap their wings considerably, by which they are easily distinguished from albatroses and petrels, which have a remarkably smooth flight, with the outstretched wings almost motionless. The Gannets which I saw, frequently look behind them during flight like the Tropic-birds.

D. piscator is very common in the Indian Ocean, between 10° N. and 10° S. I have but seldom seen it beyond these limits, and never near the Cape or in the Atlantic, where other species occur. I saw one in May as far up as the Bengal coast. Gray, white, or spotted individuals are found mixed together at all seasons, at least such was the case when I crossed the region where they occur. In November and December they were seen in flocks; in June and July they were solitary or in pairs. The food consists of fish, which they catch by plunging. They commonly fly eight or ten fathoms above the sea. Like *Sterna stolidus* this species is known by its stupidity, and by the boldness with which they

would light towards evening upon the vessel. On two occasions I nearly caught them with my hands. The English, and seamen in general, call them Boobies*.

* The species of this genus known to me are the following :—

1. *Dysporus bassanus*, Ill. *Pelecanus bassanus*, L. *Sula alba* et *S. bassana* recentiorum. Gula plumata, linea media nuda. Genæ quoque plumatæ limes faciei ad os angulatus, &c. Reliquis major. In Mari Atlantico Septentrionali.

2. *D. capensis*, Licht. Berl. Verz. p. 86. “Albus remigibus omnibus et rectricibus nigris, scapis basi albis. *D. bassano* paulo minor, 34 poll.” (i. e. 36 poll. Suec.) Gula, Facies,

This species is seen at all seasons on the great banks off the south extremity of Africa. It is easily known from the following by its greater size and more stretched-out form; it also moves its wings more during flight, instead of occasionally holding them still. I have only seen this bird at a distance, and always (in October and August) of a pure white and black.

3. *D. cyanops*, n. (Physiogr. Tidskr. pl. 5). Gula genisque nudis, facieque cæruleis, cauda rotundata.

♀ (ad æquatorem maris Atlant. d. 6 Sept.). Alba; dorsum et colli latera plumis nonnullis fuscis. Alarum tectrices minores albæ, immixtis aliis fuscis; majores omnes nigro-fuscæ. Remiges omnes nigro-fuscæ, basi intusque albæ. Rectrices fuscæ basi albidæ. Iris flavissima. Facies et rostrum ultra medium cærulea; apex olivaceus. Pedes olivacei membrana fusca. Long. 30 poll. Sv., ala 420 millim., rostrum e fronte 100, cauda 170, tarsus 52, digitus medius 70, cum ungue 82. (Alæ extensæ 5 ped. 3 poll., truncus 10 poll., latit. 5, altit. 4.)

Junior? (eodem loco et tempore anni). Differt magnitudine paulo minore, rostro ex apice fere ad basin olivaceo, dorso toto fusco, alis magis fuscis, collo et capite totis sordide albis, nec fusco-maculatis.

Adultus albus, remigibus caudaque nigris (tantum procul visus).

Pullus? fere totus cinereo-fuscus, do.

Limes faciei ut in *D. piscatore*, sed pone oculos non sinuatus. Rostrum crassius, fere 4-gono pyramidale, apice leviter deflexo. Ala ad $\frac{1}{3}$ excedit anum. Cauda submollis, alam perparum (1 poll.) superat.

Anatomia feminae supra descriptæ. Œsophagus maxime extensilis. Ventriculus magnus, oblongus, sacciformis, fere cutaneus, strato muscolari obsoleto. Pars glandulosa nulla constrictione distincta, fere dimidiam partem superiorem ventriculi constituens; glandulæ cylindricæ, altit. 3 millim., in tres arcas, lineis angustis lævibus distinctas, congestæ, limite undique definito. *Intestinum* totum longit. 80 poll. exit e latere apicis ventriculi; duodenum longissimum: 20 poll. ad insertionem ductus hepatici. Int. cæca 2 parva, 3 poll. ab ano sita. Cloaca interne sat glandulosa. *Hepar* magnum, substantia molli, lobis fere separatis, elongatis; sinistro 1 poll. pone apicem sterni extenso, 2 poll. brevior quam dextro.—*Vesica fellea* ut in plerisque natatoribus. *Pancreas* e laciniis duabus omnino separatis, linearibus, exitu cum hepatis communi. *Cor* simile *Alcæ* et *Uriæ*.—*Musculi et nervi* evidentissimi ob pinguediem vix ullam. *Sternum* longum carina humili. *Collum* angulis duobus definitis ut *Z* flexile. *Cranium* postice strictura profunda.

This species occurs in the Atlantic Ocean near the equator. I have not seen it elsewhere, but when I crossed this region (on both occasions in September) it occurred in considerable plenty. In this part of the ocean no banks are marked in the charts, though I suspect that the depth is in some places not great (perhaps not more than 50 or 100 fathoms), both from the occurrence of these birds in that region, and from the sea wanting the clear-

105. *Sterna stolidus*, L. Genus *Megalopterus*, Boie. Nigro-fusca fronte canescente, loris atris, cauda rotundata. Longitudo alæ circa 250 mill.; rostrum variat: 35—50 mill. (e fronte).

Junior magis grisescens; adulta nigrior, fronte albidior. Differt a *Sternis* propriis: forma caudæ, colore, collo longiore, et humero cubitoque ut in *Procellariidibus* longitudine trunci, unde volatus alius. Unguis medius in quibusdam, minime specifice distinctis, intus serratus (an differentia sexus? in uno ♂ observatum).

This bird, common in all collections, is one of the most widely extended species: I have found it very common in all the Indian Ocean, and in the Atlantic as far north as Madeira, though less frequent than on the other side of Africa. Like all the truly oceanic birds it was most abundant towards the south, and was seen in great numbers about 39° S. in October. According to the observations of others, it occurs still further to the south in the Pacific Ocean. At night they settled occasionally on the vessel, and could sometimes be captured by hand. One evening after dark a noddy settled on the steersman's head and was caught by him. This occurred the 7th of September near the equator in the Atlantic, and as it was the only one which I procured on that side of Africa, it served for comparison with those of the Indian Ocean: they are of the same species. I have only seen

ness and bright blue colour which prevail in great depths of ocean. This *Dysporus* moves the wings during flight eight or ten times in succession, and then sails forwards a short distance with the wings still; but it cannot, any more than the other species which I have seen, soar round in majestic circles like the petrels and frigate-birds. The same seems to be the case with *D. bassanus*, though it flies somewhat more lightly and considerably higher than the southern species. Like *Phaëton* and the other *Dyspori* this bird plunges and dives some distance under water, and then suddenly flies up again without running on the surface. Those which were opened had eaten flying-fish, and one had four of these fish the size of a common herring, besides a crab, in its stomach. Like all sea-birds they had a remarkable number of tapeworms in the intestines. The flesh was oily and tough. This as well as the Indian species showed much curiosity, though they did not fly around the pennant, which is too high for them, but kept astern of the vessel and peered down on to the deck without attempting to settle.

4. *D. piscator*, vide supra, No. 104. In Mari Indico et Sinensi.

5. *D. fuscus*. *Sula fusca*, Vieill. Gal. *Pelecanus sula*, L., Lath., secundum synonymiam et descr. sed diagnosis a *D. piscatore* desunita. Catesby 87. fig. opt.—Gula nuda, facie pedibusque flavescentibus, rostro basi convexo-incrassato, apice subrecto. Cauda rigida, acutissima, 4 poll. ultra alas. Color obscure nigro-rufescens, in adultis ventre albo. Ala 400 millim., cauda 220, rostrum e fronte 98. Hab. in Oceano Atlantico, ad Americam, intra zonam torridam. (Junior subtus quoque fuscus, Licht.) Conf. Pr. Max. Beytr. iv. p. 890.

6. *D. parvus*, Ill. (secundum Kuhl in expl. tab. Daubent. et Buff. 973.) *Pelecanus parvus*, Lath. "Niger subtus albus, facie plumosa; 18 poll. Cayenne." Lath.

7. *D. fiber*. *Pel. fiber*, L., Lath. Ut præcedens mihi ignotus. An junior *D. piscator*? sed differre videtur "dorso postice albo."

this species and *Dysporus piscator* settle on the ship, and that only after sunset, when the water was calm and the motion of the ship steady and gentle. It is an entirely unfounded assertion that sea-birds seek ships during storms and tempests, although they keep on the wing at such times, as they cannot repose on the water, and are consequently most conspicuous; moreover they often follow in the wake of the ship, as it affords them a smooth surface. Out of thousands of petrels I never saw one attempt to alight on the vessel, though they have occasionally flown close past, and been cast by the violent eddy of the sail upon the deck, where they were unable either to stand or to fly up again.

Sterna stolidus is in its mode of life very unlike the true *Sterna* with forked tails. These are coast birds, which seldom or never are seen far from land, fly high and unsteadily, live on fish, which they catch by plunging, and scream almost incessantly. *S. stolidus* on the contrary is rarely seen near the land, but chiefly far out in the wide ocean; it flies low, steady and slow, leaps upon the water when it flies up, never utters any sound, and never takes its food without settling by the side of its prey upon the water. It lives not on fish but on small mollusca, &c., and is very greedy of the fat of animals. In a word, its mode of life is identical with that of the larger petrels and albatrosses; they are strictly oceanic birds. But *S. stolidus* can stand or walk on a level surface, which the others cannot, and it consequently alights on the vessel, which they never do.

106. *Haladroma urinatrix*? Ill.—Proc. urinatrix, Forst., Gm., Lath. Certe = *Puffinuria Garnoti* e Chili, Lesson (Zool. it. Duperr. et Traité d'Orn.) sec. indiv. e Chili in Mus. Stockh. Forte eadem ac *H. Berardi* Temm. Pl. Col. 517?

In the southern parts of the Bay of Bengal I saw several times in December and January a bird which could hardly be anything else than the above-mentioned. The colour and form were clearly distinguished through the telescope at less than 100 ells distance. It was blackish gray, beneath and under the wings white, with projecting nostrils, and was but little larger than *Alca alle*, L., which it resembled in its exterior. Two or three were commonly seen together resting on the water, from which they occasionally arose and flapped with their wings like ducks. They dived remarkably well and long, like *Alca* and *Uria*, and flew heavily with a rapid motion of the wings for a short distance close over the surface.

Haladroma, from its projecting nostrils, has been included among the *Procellariæ*, but erroneously, for in all other respects it resembles an *Alca*, and differs from the former in its small wings and the want of a hind claw.

107. There now remains only a species of bird which I saw in the Bay of Bengal, but which I know not to what genus it belongs. It was full as large as the small tropic-bird, which it most resembled; it was ash-gray even on the whole under side; the wings below of the same colour, with a small transverse white line (formed by the tips of the lower covers). The wings and mode of flight are nearly like those of the small tropic-bird, but it seemed not to belong to that species, and it showed less curiosity. Two were first seen (Oct. 30) about 37° S. in the Indian Sea, one of which had the two middle tail-feathers rather longer than the rest. This was not noticed in other individuals, which on several occasions were met with in December and January, north of the equator. At the head of the bay, only ten or twelve miles from the Bengal coast, two flocks of these birds were seen, but on my return (from May to July) they were not met with.

POSTSCRIPT.

In concluding this translation of M. Sundevall's memoir, it is just to that distinguished Swedish zoologist to state, that this paper was published as long ago as 1837, which will account for occasional inaccuracies of synonymy and of classification which the subsequent progress of science has rectified. I thought it better however to republish the paper unaltered, so as to place on record in an English periodical the priority of M. Sundevall's claim to the names which he has given to certain new species, and also to show the many accurate and original observations which he made during his short stay in India. In regard to the *translation*, a few errors have inadvertently crept in which I shall point out in the following notes. It is to be regretted that so few facilities exist in this country for the study of the Scandinavian languages, which are beautifully simple in construction, while they abound in scientific and literary treasures, and exhibit many interesting points of affinity to our own.

Vol. xviii. p. 104, line 23, *for* "I did not expect to find," *read* "I did not find," &c.

P. 108, line 6, *for* "It sang," *read* "It was said to sing."

P. 252. In a letter to me Prof. Sundevall remarks of his *Acanthiza arrogans*, "This bird is the same as *Muscicapa bilineata*, Lesson, Rev. Zool. 1839, p. 104, and *Sylvia Burkii*, Burton, *Culicipeta Burkii*, Blyth."

P. 253, line 30, *for* "Three of the males," *read* "Three of the females."

P. 253, line 38, *for* "only on his second visit," *read* "died on his second visit thither."

P. 255, line 4, *for* "the edges of the under mandible being rather high, and towards the end very much bent in," *read* "which have the

edges of the under mandible rather high, and in the hind part very much bent in."

P. 257, line 34, for "Notes, habits, &c. not thoroughly known," read "The notes, habits, &c. were completely recognised."

This supposed variety of *Motacilla alba* is the *M. luzoniensis*, Scop. (*M. leucopsis*, Gould, *M. alboides*, Hodgs.)

No. 25. "*Motacilla flava*" is the *Budytes viridis* (Gm.), (*B. beema*, Sykes).

P. 260, line 34, for "The best are of compact coarse hay," read "They consist of compact coarse hay."

P. 260, last line, for "this seemed the most probable," read "were most frequently seen."

H. E. STRICKLAND.

XXX.—On the Development of the Lycopodiaceæ.

By KARL MÜLLER*.

[With five Plates.]

[Continued from p. 120.]

3. *The antheridium*.—*a. The formation of the sporangium*. This sporangium has a more simple structure than the oophoridium. It is found, almost universally, under a more or less reniform shape, having at the base a stalk, which is always longer than that of the oophoridium (Pl. V. fig. 9). The membrane is made up of cells almost regularly hexagonal, a structure which is very various in different species. In *L. denticulatum* it dehisces transversely over the vertex when ripe; but this condition is also subject to modification according to the species. In the interior is then found a free pulverulent mass, the well-known so-called *Semen Lycopodii*. As usual, they are tetrahedral cells which only differ in respect to size and nature of surface. In *L. denticulatum* the surface is covered by a number of papillæ which are broad at the base and, diminishing to a point above, are usually somewhat curved (Pl. V. fig. 1). Seen in any quantity, these spore-cells usually appear yellow: this is the case in *L. denticulatum*: in *L. pygmæum* and other species they appear reddish.

These antheridia are produced in considerable numbers on the other branch, opposite to that which is transformed into the oophoridium (Pl. IV. fig. 6). It is thus evident *a priori*, that the antheridia cannot be regarded, like the oophoridium, as metamorphosed terminal buds of a branch.

* From the 'Botanische Zeitung,' Sept. 25, 1846. Translated by Arthur Henfrey, F.L.S. &c.